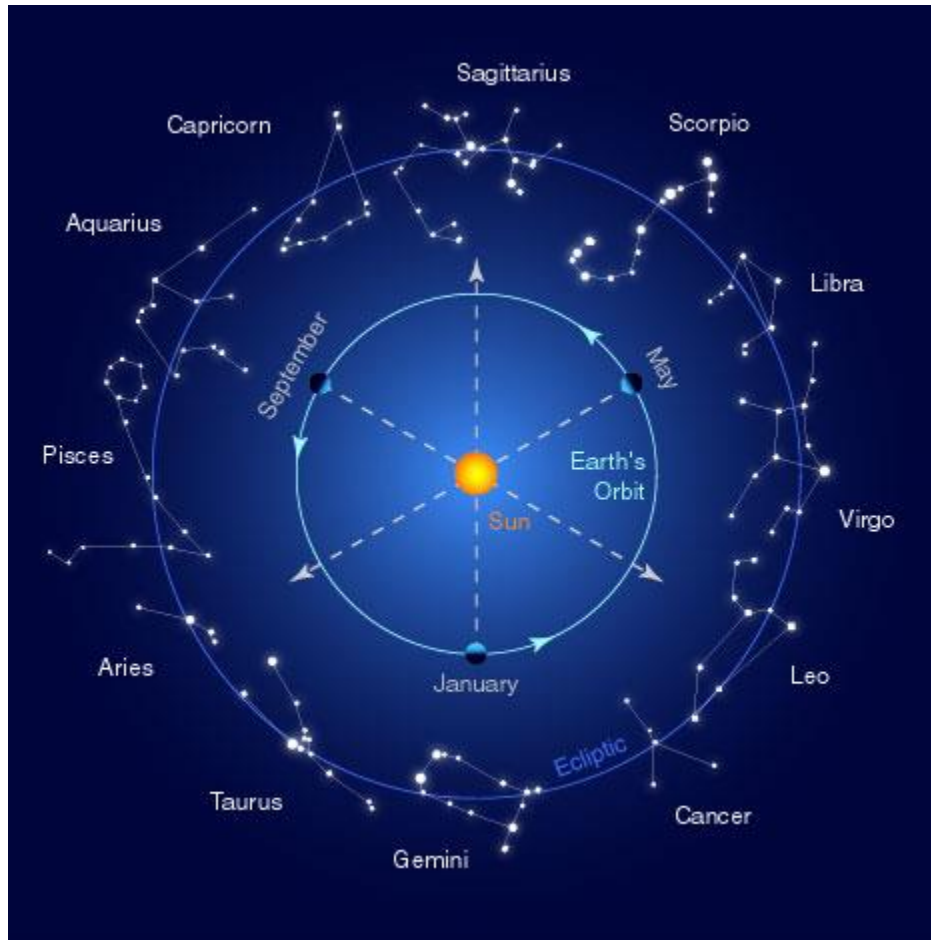


3.2 The Constellations

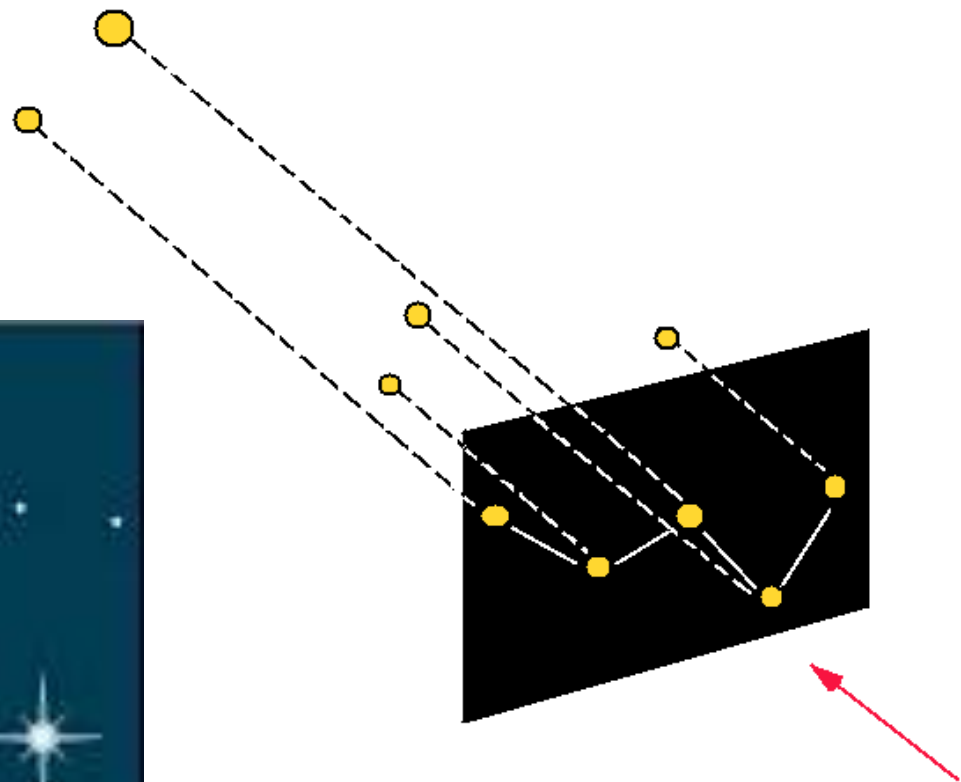
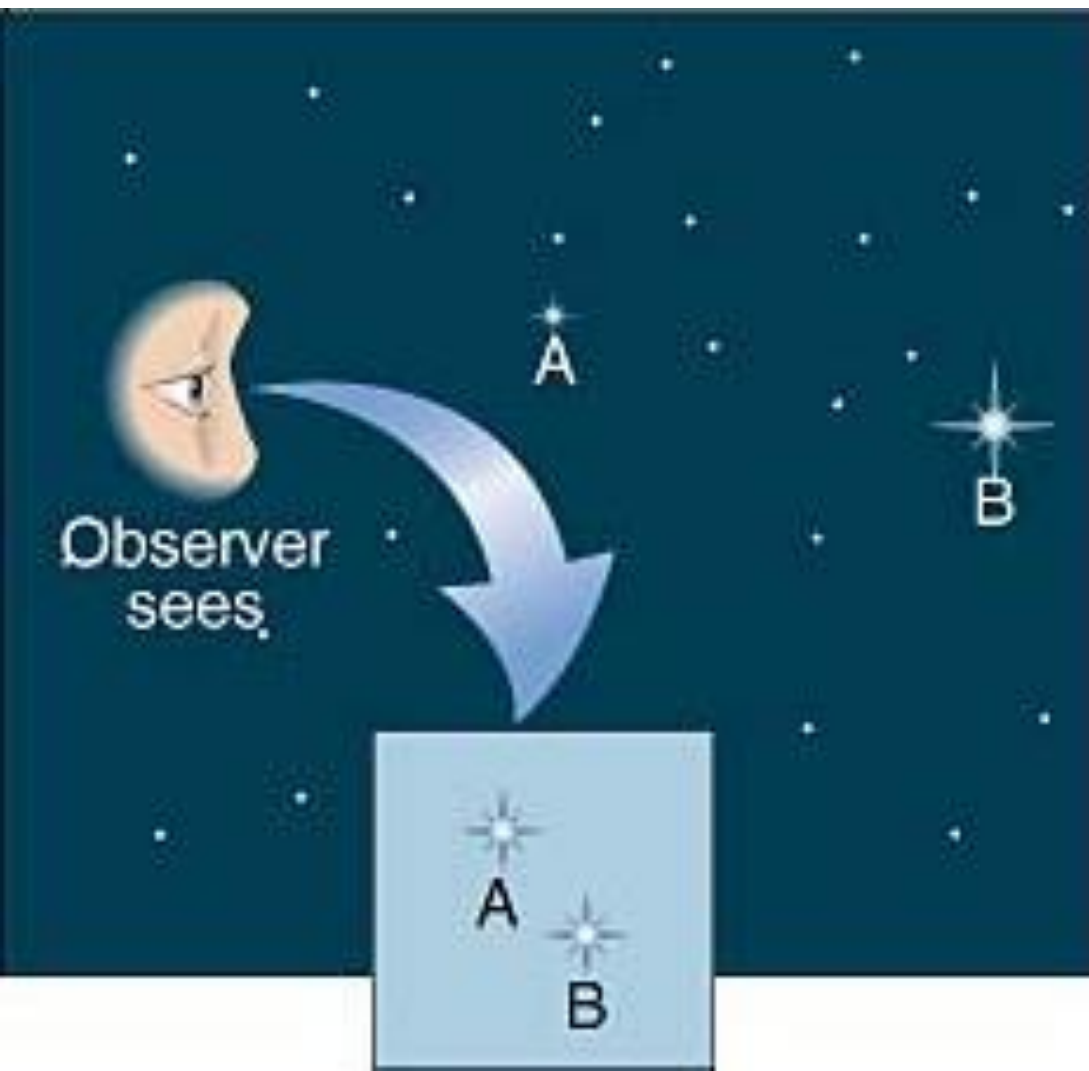


Constellation

- a group of stars that seem to form a particular figure in the sky.
- There are 88 official constellations (Northern and Southern hemispheres)
- They are mostly named after mythological characters (Greeks and Romans) and are named by the International Astronomical Union (IAU)
- Stars are not necessarily close to one another, they can be light years away from each other.

Asterisms

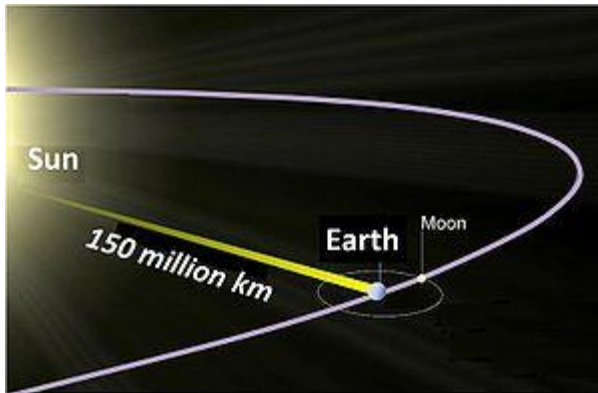
- smaller group of stars that form patterns within a constellation (ex: “Big Dipper” → Great Bear (*Ursa Major*))
-



Light-year



- A unit of distance
- The distance that light travels in one year
- Light travels at 300 000 km/s or 3.0×10^8 m/s so a light year is.....
 9.5×10^{12} km in one year!



Scientific Notation

- Example: the number 9 500 000 000 000 results in 9.5×10^{12} .
- The first part of the number (in this case, 9.5) is always greater or equal to 1 but less than 10.
- The second part of the number is a power with base 10 and an exponent number (in this case, 12).

Write the following numbers in scientific notation:

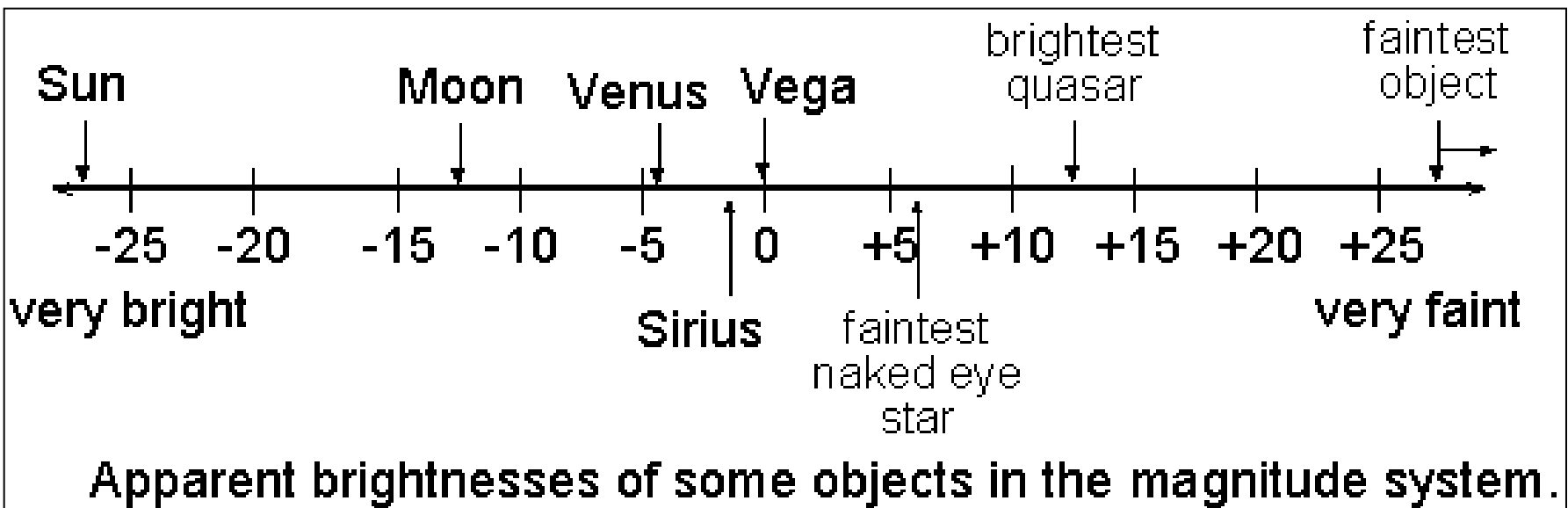
- a) the distance from the Sun to the nearest star is 40 000 000 000 000 km.
- b) the average distance from Earth to the Sun is 150 000 000 km.
- c) the distance from the Milky Way to the farthest galaxies is 13 000 000 000 ly.
- d) the total number of celestial objects in the solar system is about 152 500.
- e) the mass of the Sun is 1 990 000 000 000 000 000 000 000 000 kg.
- f) the age of Earth is about 4 550 000 000 years.

Time for light to travel...

- Sun to Earth = 8.3 min
 - Alpha Centauri (star) to Earth = 4.4 years.
 - Nearest galaxy to Earth = 25 000 years.
 - Across the Milky Way = 100 000 years.
 - Andromeda Galaxy to Earth = 2.5 million years
-

Apparent magnitude of stars :

- The brightness of a star, as seen from Earth.
- On an image, the larger the dot, the brighter the star.
- Hipparchus (130 B.C.E) – developed the first scale of apparent magnitude (1 brightest to 6.5 faintest).
- Now the scale goes beyond 6 and into the minus range.



Brightest star in the night sky is Sirius



Constellations – patterns of stars that are *light years* away of differing *apparent magnitude*.

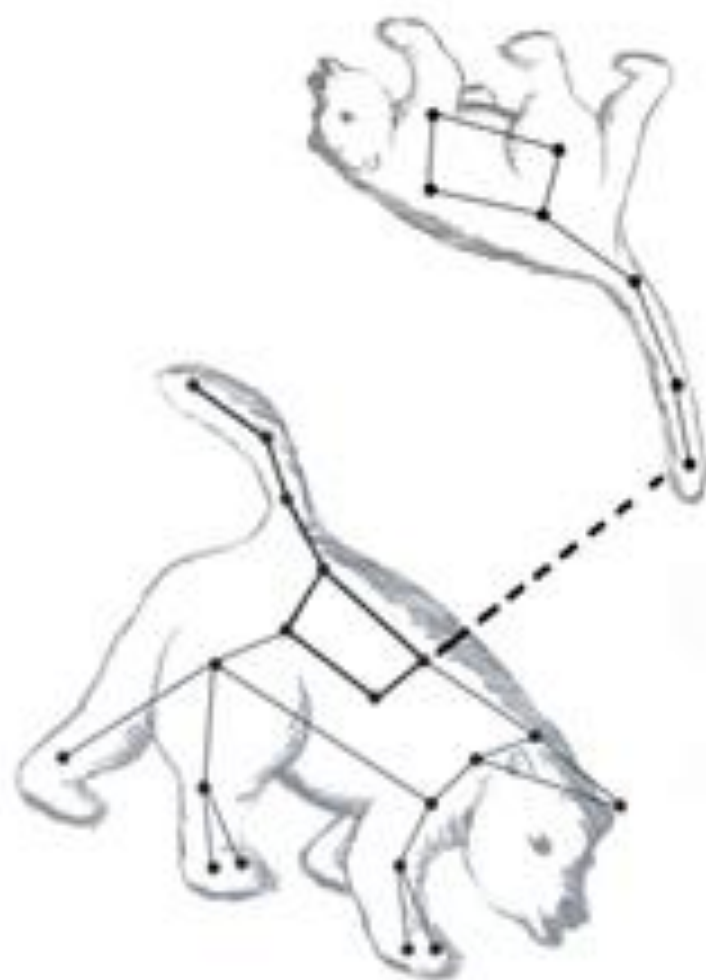
Star Chart Examples

Polaris and the Pointer Stars

- Polaris = North Star
 - Star that is most used for orientation by many cultures in the past. When you see Polaris, you are looking North.
 - Pointer stars in the Big Dipper are used to locate Polaris.
 - The Earth's rotational axis points to Polaris, it appears to stay still in the night sky.
-









Viewing different constellations

- Due to Earth's revolution around the Sun, you see different constellations at different times of year (use a planisphere to show this, also download the SkyView app)
 - Also depends on **Latitude** (location above or below equator)
 - Constellations will look different in Ottawa compared to Miami (fig. 7.14 next slide)
-

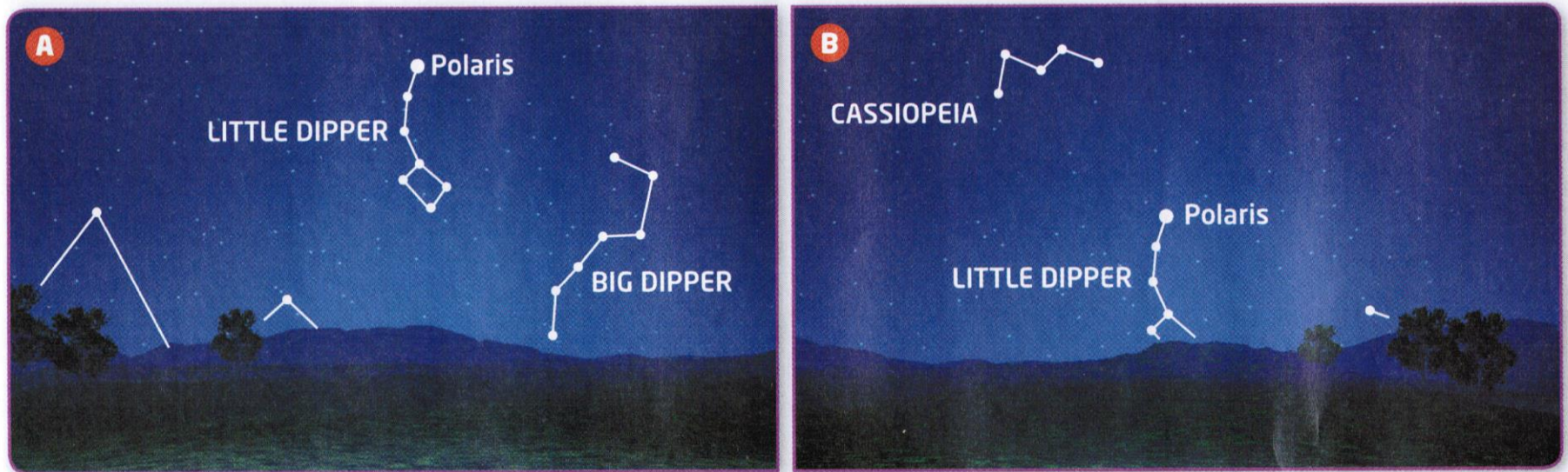


Figure 7.14 **A** The latitude of Ottawa, Ontario, is about 45°N, and **B** the latitude of Miami, Florida, is about 25°N. Polaris, in the Little Dipper, is very low in Miami compared with Ottawa.

Assigned work

- Read p. 294 to 295
 - Complete C11 Quick Lab: Reading Star Charts p.295 – answer all questions
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